2003 Consumer Confidence Report

Annual Drinking Water Quality Report

2003 DRINKING WATER QUALITY REPORT*

Consumer Confidence Report

YOUR DRINKING WATER SOURCE

The City of Leominster is in Worcester County, Massachusetts. It lies entirely within the Nashua River basin. It is bounded by Fitchburg to the north, Lunenburg to the northeast, Lancaster to the southeast, Sterling to the south and Princeton and Westminster to the west. The city encompasses approximately 29.67 square miles of land of which 36 percent has been developed. Much of the western half of the city is part of state forest and municipal conservation areas. The conservation areas also include watershed lands.

The City of Leominster obtains its supplies through four local sources: the Distributing Reservoir system at Exchange Street, the Fallbrook Reservoir system at Wachusett Street, the NoTown Reservoir system at Route 2 East, and the Southeast Corner Wellfields at Jungle Road. Leominster also has an emergency connection to the Wachusett Reservoir at Rte 110. These systems are described in depth in appendix A as taken from a report prepared for the city by the firm of Camp, Dresser & McKee. A copy of this report can be obtained by contacting Mr. Matthew Marro at (978) 534-7524 ext 517.

In May of 1999, the City of Leominster completed a 4.5 Million-Dollar program to rehab the Fallbrook, NoTown, and Distributing Reservoir treatment systems. This capital improvement program has brought the system to compliance with the Safe Drinking Water Act, and has addressed issues brought about by DEP yearly sanitary surveys. These issues included storage of Chlorine, automated monitoring, and security of all of the facilities. The new facilities now have state of the art on line monitoring and chemical storage. The plants also possess security systems. More information on DEP sanitary surveys can be obtained by contacting Mr. Marro at the above listing or by email at mattmarro@cs.com or mmarro@DPW.leominster-ma.gov.

SUBSTANCES FOUND IN TAP WATER

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring mineral, and in some cases, radioactive material. It can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial contaminants – such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants – such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides – which may come from a variety of sources such as agricultural, urban stormwater runoff, and residential uses.

Organic chemical contaminants – including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants – which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (EPA) prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water that must provide the same

protection for public health. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA Safe Drinking Water Hotline at 800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and some infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by Cryptosporidium are available from the Safe Drinking Water Hotline at 800-426-4791.

IMPORTANT DEFINITIONS

Maximum Contaminant Level (MCL) – the highest level of a contaminant that is allowed in drinking water.

Maximum Contaminant Level Goal (MCLG) – the level of a contaminant in drinking water below which there is no known or expected risk to health.

Treatment Technique (TT) – A required process intended to reduce the level of a contaminant in drinking water.

Action Level (AL) – The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

The following definition is required if the Public Water System is under a variance or exemption:
Variances and Exemptions – State or EPA permission not to meet an MCL or a treatment technique under certain conditions.

** You may refer to this report as an annual water quality report or a consumer confidence report.*

HOW ARE THESE SOURCES PROTECTED?

The Department of Environmental Protection (DEP) has prepared a Source Water Assessment Program (SWAP) Report for the water supply source(s) serving this water system.

The SWAP Report notes the key issues activities in zone 1 and zone A, residential land uses, transportation corridors, hazardous materials storage, agricultural activities and golf courses, Oil or hazardous materials contamination sites and comprehensive well head protection planning in the water supply protection area for all of our water sources. The report commends the water system on aggressive land acquisitions in the water supply protection district, installation of sanitary sewers, and the City of Leominster water divisions continued public education efforts

What can be done to improve protection?

The SWAP report recommends:

- Removal of non water supply activities in the zone A or zone 1 where feasible.
- Continued public education.
- Training and awareness activities with Emergency response personnel.
- Partner with Local business to ensure proper storage and handling of hazardous materials.
- Monitor progress on remedial action sites.
- Develop a well head protection plan.

Leominster water plans to address the protection recommendations by:

- Continuing our work with local and state educational agencies to promote water supply awareness education.
- Continued participation in the Local Emergency Planning Committee.
- Continued implementation of watershed and wellhead protection measures.
- Implement a watershed stream monitoring program.

Residents can help protect sources by:

- practicing good septic system maintenance;
- supporting water supply protection initiatives;
- taking hazardous household chemicals to hazardous materials collection days;
- contacting the water department or Board of Health to volunteer for monitoring or education outreach to schools;
- limiting pesticide and fertilizer use, etc.

Where can I see the SWAP Report?

The complete SWAP report is available at the water department and online at www.state.ma.us/dep/brp/dws/. For more information, call Matthew Marro at 978-534-7588 ext 517 or email mmarro@DPW.leominster-ma.gov.

WATER QUALITY TESTING RESULTS

Contaminant	Highest Detect Value	Range Detected	Average Detect	MCL	MCLG	Violation (Y/N)	Possible Source of Contamination
Trihalomethanes	130.0 ppb	0-130.0 ppb	74.5 ppb	80	60	N	Chlorine by products
Lead	.26 mg/l	0-.25 mg/l	0.0125 mg/l	.015	.010	N (action level only)	Solder in plumbing not in source water!
Copper	1.8 mg/l	0-1.8 mg/l	0.405 mg/l	1.3	0.5	N	Same as above
Nitrate	1.1 mg/l	0-1.1 mg/l	0.05 gl/l	10.0	1.0	N	Fertilizers
Total Coliform	None	No Detects	None	0	0	N	Bacteria from lack of disinfection or contamination.
Inorganics:							
Barium	0.028 mg/l	0-0.028 mg/l	0.010 mg/l	2.0	2.0	N	Found in nature
Alpha	0.6 pi/l	0-0.6 pi/l	0.2 pi/l	.6	.6	N	Found in nature
Sodium	52.0 mg/l	3.8-52 mg/l	16.0 mg/l	None	25 mg/l	N	Found in nature, chemical addition and road salt.
Haloacetic Acids	84.0 mg/l	0-84.0 mg/l	23.50 mg/l	64.0 mg/l	50	N	Chlorine By-products
Radium 228	0.4 pi/l	0-0.4 pi/l	0.1 pi/l	.4 pi/l	.4 pi/l	N	Found in Nature

Notice regarding Volatile Organic Chemicals and Synthetic Organic Chemicals:

This system has a monitoring waiver for this contaminant due to no detects found in previous monitoring. Because the water has been found by the Department to be protected from this contaminant, monitoring frequency has been reduced. The last sample collected was on 9/15/98 and was found to be free from the presence of this contaminant.

The City of Leominster is dedicated preserving the quality and reliability of its drinking supplies. Along with the completion of the new treatment facilities, the department has aggressive flushing and water main replacement program. Further information can be obtained by contacting Mr. Matthew S. Marro at 534-7588 ext 517.

Appendix A Table 2-2

Safe Yield and System Capacity Information City Of Leominster

Surface Water Supply Information

Reservoir Dimensions[a]	Distributing Reservoir	Fall Brook Reservoir	No Town Reservoir
Total storage Capacity (MG)	206	419	711
Available Storage Capacity (MG)	206	348	701
Water Surface Area (sq. mi)	0.11	0.13	0.43
Watershed Area (sq. mi.)	1.89	1.12	5.17
Intake Type	Gravity	Gravity	Gravity
Size of Intake	2 pipes@14”	20”	2 pipes@
Capacity of Intake (mgd)	unknown	unknown	10+
Safe Yield Calculation[b]			
Unit Storage (MG/sq. mi.)	109	310	136
Area Ratio (water surface to watershed)	5.8%	9.2%	8.3%
Coefficient of Variation of Annual Discharge	0.32	0.32	0.32
7-Day 2-Year Low Flow (cfs/sq. mi.)	0.41	0.41	0.41
Evaporation Adjustment Factor (cfs/sq. mi.)	0.02	0.07	0.08
Calculated Safe Yield (mgd)[c]	1.32	0.96	2.2
Reported Safe Yield (mgd)[a]	1.09	1.45	3.5
System Capacity Information[a]			
Treatment Plant Capacity (mgd)	not applicable	2.0	4.0
DEP/WMA Registered Withdrawal (mgd)	4.9 from entire basin, including wells		

1. Data includes Morse and Haynes Reservoirs *2. Data includes Goodfellow Pond and Simonds Pond.*

Groundwater Supply Information

Well Dimensions	Southeast Corner Well #110	Southeast Corner Well #120	Southeast Corner Well #160
Casing Diameter (in)	18	18	24
Slot Size (0.001)	200	200	125
D-Well Depth (ft)	53	54	81
L-Screen Length (ft)	13	13	25
Safe Yield Calculations			
W-Depth to Static Water – typical (ft)	1.37	unknown	1.47
A-Available Water – typical	34	approx. 33[e]	50
S-Specific Capacity – Installed (gpm/ft)	35	unknown	20
Current (gpm/ft)	unknown	unknown	unknown
Effective Safe Yield (mgd)[f]		1.0 for the wellfield	
Reported Safe Yield (mgd)		1.0 for the wellfield	
System Capacity Information			
Rated Pump Capacity (mgd)	0.65	0.60	0.64
Actual Pump Capacity (mgd)	0.63	0.59	0.62
DEP/WMA Registered Withdrawal (mgd)	4.944 from entire basin, including reservoir system		

a. Source: City of Leominster, 1987b, except available water and effective safe yield
b. Determined as part of this study (see text), except reported safe yield and calculated safe yield
c. For a 15 probability of failure (see text) d. Determined as part of this study, as A = D - L - W - S
e. Assuming a 24-foot depth to static water level, since all three wells are close together
f. Calculated as 0.75*s*A g. May be substantially less; see text

These data indicate an effective (calculated) Safe Yield for this reservoir of 0.96 mgd, which is substantially below the reported safe yield of 1.45 mgd (City of Leominster, 1987b). Comparison with recent operational records is limited to a 3-month period, since this source was off line during construction of the new filtration plant during most of 1987 and 1988. During this period, however, average daily withdrawals totaled 0.83 mgd. which compares favorably with our calculated yield of 0.96 mgd. Since the reported safe yield of 1.45 mgd differs substantially from our estimate, further analysis of actual operational records may be warranted.

2.2.1 Distributing Reservoir System

The Distributing Reservoir system is located in western Leominster along the north fork of Fall Brook. The system consists of three small reservoirs, known as the Haynes, Morse and Distributing Reservoir.

Applications of the USGS technique to the reservoir system results in the following estimated yields:

Yield (mgd)	Probability of Failure (%)
1.32	1
1.48	2
1.72	5
1.94	10
2.20	20

These figures suggest that the effective (calculated) safe yield for this system is 1.32 mgd, which compares favorably with reports average annual withdrawals during 1987 and 1988 of 1.10 mgd and 1.26 mgd, respectively. The reported safe yield for this system is 1.09 mgd (city of Leominster, 1987b).

2.2.2 Fall Brook Reservoir

The Fall Brook Reservoir is located in southwestern section of Leominster on Fall Brook.

Applications of the USGS technique to the reservoir system results in the following estimated yields:

Yield (mgd)	Probability of Failure (%)
0.96	1
1.03	2
1.15	5
1.24	10
1.35	20

These figures suggest that the effective (calculated) safe yield for this system is 1.32 mgd, which compares favorably with reports average annual withdrawals during 1987 and 1988 of 1.10 mgd and 1.26 mgd, respectively. The reported safe yield for this system is 1.09 mgd (city of Leominster, 1987b).

2.2.3 No Town Reservoir System

The No Town Reservoir system is the largest reservoir system in Leominster. This system is located in the northwestern corner of the city, on Monoosnoc Brook. It consists of No Town Reservoir, Goodfellow Pond, and Simonds Pond. Water from this system is treated by filtration in the No Town Water treatment Plant.

Applications of the USGS technique to the reservoir system results in the following estimated yields:

Yield (mgd)	Probability of Failure (%)
2.2	1
2.6	2
3.1	5
3.7	10
4.4	20

The calculated safe yield of 2.2 mgd is, however, well below the safe yield (3.5 mgd) reported in Leominster's Water Management Act Registration Forms (City of Leominster, 1987b). The 3.5 mgd estimate is reported to be based on previous engineering reports and past operational experience. Given the magnitude of the discrepancy between these values, and noting that this reservoir system failed during the 1960's drought, more detailed analysis may be warranted to better quantify the effective safe yield.

2.2.4 Southeast Corner Wellfield

The Southeast Corner Wellfield, located on the North Nashua River, is used to augment local surface water supplies when necessary. Based on review of reported specific capacity and available water estimates and the application of DEPs methodology outlined as part of the new source approval process, the combined Safe Yield for the wellfield is estimated to be 1.0 mgd. This estimate is identical to that reported by the city (City of Leominster, 1987b). However, during 1987 and 1988, withdrawals totaled only 0.33 mgd and 0.26 mgd, respectively.

In Section 5 of this report, the recharge area to the wellfield is delineated on the basis of a review of hydrogeologic data and well operational characteristics. The resulting delineation suggests that a sustained yield of 1.0 mgd is not possible without drawing substantially from aquifer storage. In fact, mass balance of recharge area against well yield indicates that a sustained safe yield of approximately 0.3 mgd is more likely.

Although it is clear from the data presented in Table 2-3 and from the information presented above that the wellfield is capable of yielding approximately 1.0 mgd for short periods (1 to 2 months), its ability to yield this quantity of water over longer sustained periods is questionable and warrants further investigation.

2.2.5 Total Effective Safe Yield

The combined effective Safe Yield for local supplies in Leominster is estimated to be 5.48 mgd. This figure is approximately 1.6 mgd lower than that reported by the city, but consistent with the 4.9 mgd DEP/WMA Registered Withdrawal. This figure was based on 5 years of actual withdrawal data. Given the magnitude of the discrepancy between computed and reported safe yield, further investigation appears warranted.

CITY OF LEOMINSTER, MASS.
WATER DEPARTMENT
DIAGRAMMATIC PROFILE OF SUPPLY

SCALE : VERTICAL 1 IN. = 80 FT. MAR. 1960 REVISED DEC. 1988